



Introduction

- 2010 was the eleventh year for our community-based project.
- Our purpose is to accelerate the re-vegetation of barren areas in and around our communities by the application of crushed limestone.
- Because of the ruggedness of our terrain, it is not feasible to do the work by machine, so we use people-power, namely students from local schools and adult volunteers.
- Conditions were relatively dry underfoot in the bush through mid-May. A rainy spell led to the cancellation of eight school Greening sessions May 20-31. June started warm and sunny. Spells of heavy rain late in July through mid-August led to exceptionally high water levels in the bush. In general, a good growing season. Birch, poplar and other woody species in our best areas are now commonly 4-5 metres high.
- The organizational and scientific backgrounds to our project are explained in Appendices 1 and 2 - below.

Our Partners

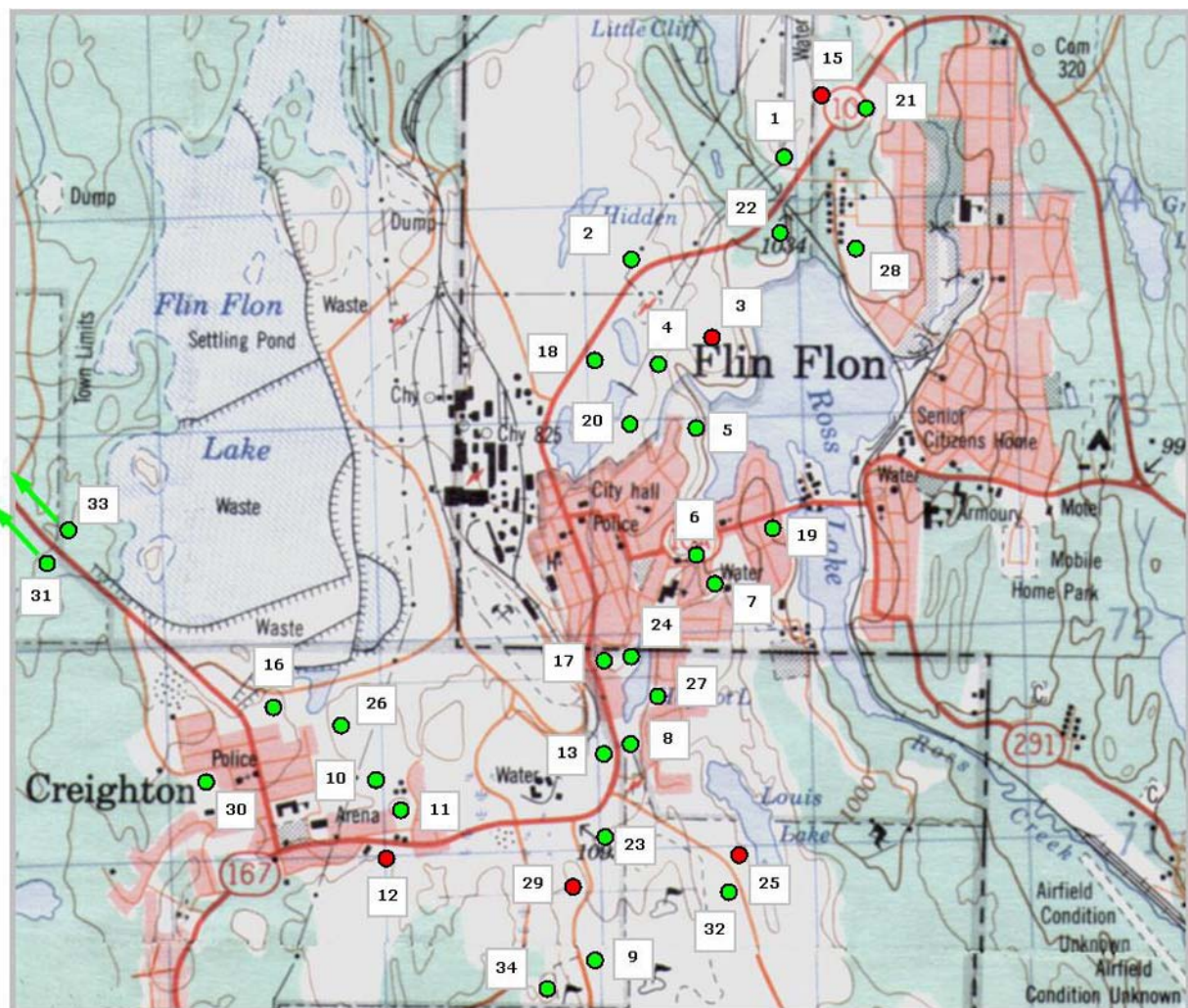
We gratefully acknowledge that our project has been made possible through the generosity of our partners. Major funding for the work in 2010 came from Hudson Bay Mining and Smelting Company Ltd. (HBMS). Crews from the City of Flin Flon the Town of Creighton hauled the limestone to the areas to be treated. Flin Flon School Division and its Youth Mentor program and Creighton School Division supplied the bulk of our workforce. Hudson Bay Exploration and Development

Company Ltd. supplied us with air photographs. Home Hardware donated supplies. Kelly Gilmore supplied birch seed collected at his lot at Bakers Narrows.

Area Treated

In the map below, green circles indicate areas we treated in 2000 through 2009, red circles indicate those treated in 2010.

Area names are as follows: 1: Balsam, 2: Rock Cut, 3: Second Valley North, 4: Second Valley West, 5: First Avenue, 6: Hiawatha, 7: Grandview, 8: Hapnot, 9: Phantom, 10: Knight North, 11: Knight, 12: Pizza, 13: South Main, 15: Esso, 16: Creighton North, 17: Super K, 18: Triple Seven, 19: Market, 20: Reservoir Hill, 21: Lancaster, 22: Railroad, 23: Phantom North, 24: Hapnot North, 25: Louis, 26: Creighton East, 27: South Hudson, 28: Roche, 29: Phantom Northwest, 30: Red Mountain, 31: Hilary, 32: Golf, 33: Sand Bar, 34: Driving Range.



During a field season lasting from April 15 through September 8, we spread 82 yards of crushed limestone (dolostone) in 5 areas to cover a total of 4.3 hectares (10.6 acres). Appendix 3 tabulates limestone usage. During the project period 2000-2010, we have treated 46.8 hectares (115.6 acres) with 1,011.4 yards of limestone (an application rate of 21.6 yards/hectare).

Volunteer Field Personnel

The work was carried out by 814 individuals during 39 sessions (617 school students - 24 sessions, 36 members of the general public - 6 evening sessions, 11 University College of the North electrical students who were participants in the UCN 'Extending Hands' program - 1 session, 96 Canadian Baptists of Western Canada youth volunteers - 6 sessions, 19 members of the Natural Resources Youth Training Program in 1 session and 35 participants in the City of Flin Flon Recreation Department 'Summer-in-the-Parks' and 'Base Camp' programs - 1 session). It should be noted that 8 school sessions had to be cancelled during the period May 20-31 due to rain. Details on personnel distribution are tabulated in Appendix 4. At left below are McIsaac grade 1 students after a work session at our Louis area in June. At right are some of the Canadian Baptists of Western Canada volunteers after a session at the Pizza area in July.



New Growth in Treated Areas

The areas we are treating are either totally barren, or have a few scattered tufts of the acid- and metal-tolerant grass *Agrostis stolonifera*, and a few stunted relict poplars, birches, and willows. Original organic topsoil is commonly entirely absent, or where present is thin. The ground surface is a combination of bare rock

outcrop, and sandy or silty gravel with a variable content of pebbles and boulders. Areas treated in May and early June of each project year have generally shown some signs of life (typically Manitoba maple) within a month. By August, seedlings of birch, aspen, balsam poplar, and a variety of willows appear. Although the maples tend not to over-winter well, the others flourish, and in the second season grow to about half a metre. Conifer seedlings tend not to appear until a year or two after the treatment.

Birch, poplar and aspen in several of our areas are now 3-4 metres high, and at our Knight, Knight North and Hapnot areas (treated in 2000 and 2001), some individuals are over 5 metres high. As of the fall of 2008, self-seeded conifers were present in fourteen of our areas - they are now present in twenty two. Jack pines - commonly associated with old relict parents - are locally up to 3.8 metres high, and a tamarack at our Knight area is 3.1 metres high. Cones were noted on pines (self-seeded and transplanted) in several of our areas in 2008. Since last year, cones have been noted on a few spruce - and also on a tamarack. Until now, self-seeded tamarack had been noted only at our Knight area (three individuals), but this year a small seedling which is probably a tamarack was noted at our Creighton East area. Individual Scots pines were noted for the first time at the Knight and Knight North areas. These were presumably seeded from imported trees planted in local yards. Alders were not seen in any of our areas until 2005 - they have now been noted in fourteen (two more than in 2009). In five of these areas, it appears that the seed came from individual alders planted in 2001. Individuals and small clusters of dwarf birch were first noted at our Knight area some years ago. Dwarf birch has now been recognized in three areas.

Although understory species such as fireweed, rough cinquefoil, raspberry and bearberry are quite widespread, they tend in general to be few and far between. Our best areas in terms of variety and density of understory species are South Hudson and Roche. The grass *A. stolonifera* tends to spread following treatment, and a few other grass and sedge species have appeared in some areas. Some of our best areas in terms of density of woody species - such as Creighton North - still have almost no understory vegetation.

In parts of several of our best and most densely vegetated areas, there is now an accumulation of dead leaves from the falls of 2009 and 2010 - the beginnings of a new organic topsoil. In one of these areas - Knight North - the mushroom *Amanita*

muscaria was noted for the first time. In the pictures below, Amanita enjoys the shade provided by a dense canopy of birch, and a carpet of dead leaves.



Appendix 5 provides an indication as to how well each individual area is progressing. It is notable that the four areas characterized as 'poorest' are within about a kilometer of the HBMS stack. The five areas characterized as 'best', are all south and southwest from Flin Flon. We have recognized since the early years of the project that some areas are 'slower' than others, that is, there is a variation in the rate of germination and growth and in vegetation density from one area to another. We hope that studies presently underway (see below) will provide an explanation and a remedy for this.

Planting and Seeding

Although we depend primarily on the natural 'seed rain' to do the re-vegetating for us, we have done some small-scale experimental planting and seeding.

In September 2001, following advice from our consultant the late Professor Winterhalder, small 'plantations' were established in ten of the areas we had previously treated. In each we put four spruce seedlings, one alder (a nitrogen fixer) and one pine or tamarack. These were taken from the right-of-way along the Kisseynew Lake road during a very wet spell. To date, survival in the plantations has been close to 100%. A grass fire in June, which reached the west end of the Balsam plantation, singed the pine and the alder and one of the spruce. In August, it was noted that the alder was dead. Vandals broke off the main trunks of the two pines at the Hapnot plantation at knee-height, but growth of the lower branches continues. It is of interest to note that growth and state of health

in the plantations varies from area to area, and closely parallels the variation in area 'vegetation scores' in appendices 5 and 6. Plantation conifers in some areas categorized as 'best' (such as Knight and Knight North) are very healthy and up to 3.35m high, while those our 'poor' areas (such as Rock Cut and First Avenue) are more sickly-looking and are not a great deal bigger than when they were put in. Pines at the Balsam and Knight plantations produced cones for the first time in 2008. Cones appeared on the pines at the Second Valley, Hapnot and Pizza areas for the first time in 2009. The tallest spruce in our Knight North plantation produced masses of cones in 2009 - these were the first spruce cones to have appeared in any of our treated areas.

Pine and spruce cones were scattered in seventeen of our areas in 2002 through 2004. Germination has taken place in eleven of these areas. Some of the pine seedlings from cones scattered by Saskatchewan Ministry of Environment personnel at our Knight North area in February 2002 are now up to 3.8m high. Seedlings in the other areas are up to 2.2m high. The pines at the Knight North area produced cones for the first time in 2008. In 2010, cones appeared on pines at our South Main and Phantom areas.

In 2003 and 2005-2007, local Cubs and Beavers planted hundreds of spruce and pine seedlings - as well as several other species - at the Second Valley, Reservoir Hill, Phantom and Balsam/Esso areas. Survival rate for the conifers has been high - probably better than 90% in most areas. Results to date are best at the Balsam/Esso area where some pines up to 85cm high have cones. Results are more patchy at the Second Valley area where mortality for both spruce and pines is high at square 1, but healthy spruce up to 65cm high are quite widespread at squares 5, 6 and 8. Reservoir Hill (below) is one of our 'slower' areas, but these spruce, planted by the Cubs and Beavers in 2005 are doing well.



Spruce seedlings from SaskPower's Shand Greenhouse were supplied to us by Saskatchewan Ministry of Environment Creighton office personnel in 2005. They were put in by Green Project staff at three of our areas. Those at our Balsam and Railroad areas and are doing quite well and are up to 60-80cm high. Some are healthily green and filling out (particularly at Balsam), while others are smaller, thinner and less regular, and tend to be a bit yellowish. Those put in at the Triple Seven area were buried during HBMS landscaping activities in the fall of 2008.

In April 2009, Donna Lundquist of the Saskatchewan Ministry of Environment donated 14 kilograms of jack pine and white spruce seeds. These had been collected in 1995 and 1978 respectively, and were being removed from inventory because of their low (estimated 40%) viability. They were scattered in six of our areas by Green Project staff on April 25 2009, and by Creighton grade 4 students at the Sandbar area June 8. Good densities of seedlings were noted this season at our Balsam, Esso, Railroad, Hilary and Sandbar areas. These were dominantly pine up to 10-15cm high - associated with a few smaller spruce. A very few small pine seedlings were noted at our Reservoir Hill and Market areas.

This year, several pounds of birch seed collected by Kelly Gilmore at his Bakers Narrows lot were scattered at our Rock Cut, First Avenue and Reservoir Hill areas.

Supplementary documentation on the above, and on some of our other planting and seeding projects is available on request, and will shortly be posted on our web site.

Scientific Studies

As noted above, many of our areas have responded very well to the limestone treatment, others are coming along more slowly, while in a few the response has been minimal. What accounts for this varying response? Might it be due to variations in the base-metal content of the soil? What treatment in addition to the application of crushed limestone might be needed to enhance germination and growth of woody species in our 'slow' and 'poor' areas - and to encourage growth of understory species? At the time of his death in October 2005, our consultant Professor Keith Winterhalder had been conducting greenhouse experiments with a view to providing answers to these questions.

Following preliminary discussions with HBMS and Green Project coordinators in late 2007, members of the faculty at the University of Saskatchewan's Department of

Soil Science drafted a proposal for a multi-year research project aimed at significantly expanding on the work initiated by Professor Winterhalder. Funding secured from HBMS and the Natural Sciences and Engineering Research Council of Canada will allow the project to go ahead for an initial three-year period - with the possibility of an extension for a further two years. Site assessment - which included detailed soil mapping and collection of soil samples for laboratory characterization - was carried out in 2008 and continued through 2009. Other project components include development of amendment strategies, metals characterization and speciation, and soil ecology and ecosystem sustainability. Green Project coordinators, HBMS staff and Soil Science faculty and students met in Flin Flon in June and on the campus in Saskatoon in December to review progress.

A study on the health implications of elevated levels of some metals and other elements in the soils of Flin Flon and Creighton, was referred to in our 2007-2009 Reports of Activities. The final study report was released in June, 2010. This report, together with other information on the study - which was carried out on behalf of HBMS by Intrinsik Environmental Sciences Inc. - is available at www.flinflonsoilsstudy.com.

Manitoba Conservation ecosystem monitoring specialist Geoff Jones visited Flin Flon in 2008 to resume monitoring vegetation on transect lines set up by Professor Winterhalder in a number of our areas. A detailed report on this work was submitted in June, 2009. A further five days of field work was carried out in July, 2009. We were saddened to learn that Geoff passed away in January, 2010. We hope that someone else can be found to continue working on this project.

Photography



Pairs of 'before-and-after' pictures illustrate in a dramatic way, how effective the limestone treatment is proving to be. The pictures above were taken at our Creighton East area - the one at left in July, 2004, the one to the right in August, 2010. During our first ten project years we took 1,847 pictures, and in 2010 we took an additional 154. These will serve as a permanent record of the project, and are being used for public relations purposes.

Public Relations

Our annual public informational meeting (29 attendees) was held at the Flin Flon School Division office June 4. Presentations were given by faculty members from the University of Saskatchewan Soil Science Department and by Green Project coordinators. Articles in the Flin Flon 'Reminder' kept our project in the public eye again in 2010. Local radio station CFAR kept the public informed of our activities over the summer months. Our web-site - www.greenproject.ca - was kept up-to-date. We made posters and brochures which were distributed to local schools.

Future Plans

We aim to treat another five hectares in 2011. We will continue work at our Pizza, Esso and Louis areas, and start work at our new Rock Cut North, Icehouse, Headframe, Larson and Creighton Creek areas. We plan to have our annual informational meeting in June.

Additional Information

Please contact project coordinators:

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and check out our web site at: www.greenproject.ca

APPENDIX 1: Organizational Background and Procedures

In the late 1960s and early '70s, botanists at Laurentian University - among them our technical consultant, the late Professor Keith Winterhalder - found that the application of crushed limestone to the barren acidified and metal-contaminated soils around Sudbury led to the regeneration of vegetation. A major program of limestone application since then has led to a transformation of the Sudbury landscape.

In the early 1990s, Rena Gummerson and later Cathy Hynes of the Creighton /Denare Beach Economic Development Committee contacted Professor Winterhalder to see if he might be interested in helping to set up a re-vegetation program in our area. This resulted in his first visit up here in 1994. In 1999, Heather Acres and Clarence Pettersen of Flin Flon School Division thought that re-vegetation would be a good project for their Youth Mentor program and the Green Project was launched with the support of the School Division. Hudson Bay Mining and Smelting Company Ltd. and the Flin Flon Economic Development Commission generously provided funding to bring Professor Winterhalder up here in October 1999. He spoke to a number of groups and generated a high level of interest and enthusiasm. A community-based consultation group was formed, and planning meetings were held in March and April 2000. McKeen's Trucking generously donated 130 yards of crushed limestone, and this allowed us to put our first groups of students to work in the field in May of that year.

Present members of the consultation group are: Flin Flon School Division, Creighton School Division, City of Flin Flon, Town of Creighton, Flin Flon and District Environment Council, Hudson Bay Mining and Smelting Company Ltd., Saskatchewan Ministry of Environment and various community group leaders and members.

The first stage in planning our field operations involves checking out maps and air photographs. From these we get a general idea as to which areas might be suitable for treatment. We then ground-check the areas. Once their suitability has been confirmed, the crushed limestone is trucked in. Volunteers fill their pails at the dumps and spread the limestone as evenly as possible. The coordinator/supervisor makes sure no gaps are left. Work continues until the designated area is completely covered.

APPENDIX 2: Environment and Science

In and around the communities of Flin Flon and Creighton¹, there are large areas with little or no vegetation. Old tree stumps show that these areas were once forested.

In the 1920s and '30s when our communities and the smelter complex were first established, many trees were cut for fuel and lumber. Others were cut to make fire breaks, or were burned in forest fires. As production from the Flin Flon and other mines increased, so did the amount of sulphur dioxide smoke from the smelter. The smoke is harmful to vegetation, so the forest was not able to recover. The increasing acidity and metal content of the soil meant that only a very few hardy types of plant were able to survive. As the plants died, the thin topsoil washed away.

High levels of metals such as copper and zinc in the soil are toxic to plants³. This toxicity is accentuated by acidity, which makes the metals more soluble, and therefore more accessible. When seeds germinate in metal-contaminated soil, growth stops immediately on contact with the toxic soil solutions. The carbonate ion in the limestone tends to neutralize soil acidity, thus making the metals less soluble, and less toxic. Another component of the limestone, calcium, contributes to reducing soil toxicity by competing with zinc ions for uptake by plant roots. Calcium ions also have a strengthening effect on the plasma membranes in the root cells. This membrane is responsible for determining what is absorbed by the roots.

Since the early 1970s, Hudson Bay Mining and Smelting Company Ltd. spent hundreds of millions of dollars to improve technology at the smelter complex, with the result that emissions of sulphur dioxide and metal oxide dust were significantly reduced. The natural vegetation started to slowly recover. Our project is accelerating this recovery. In June 2010, the copper smelter was closed down, resulting in a complete cessation of gaseous and particulate emission from the stack.

¹ *Flin Flon and Creighton are situated on either side of the Manitoba/Saskatchewan boundary about 600 kilometres north of the Canada/US border. A large copper-zinc ore body was discovered at Flin Flon in 1915, and production - which started in 1930 - continues to the present day.*

³ *This paragraph is from information supplied by the late Professor Winterhalder.*

APPENDIX 3: Crushed Limestone Usage in 2010

Areas	Remaining from 2000-'09	Delivered 2010 (yards)	Remaining at end 2010	Used in 2010	Hectares covered	Applicn. rate (yd./ha.)
Balsam	1	-	1	-	-	-
Rock Cut	1	-	1	-	-	-
Sec.Val.	7.37	-	5.97	1.4	0.152	9.21
FirstAv.	-	-	-	-	-	-
Hiawath.	1.03	-	1.03	-	-	-
Grand.	0.93	-	0.93	-	-	-
Hapnot	-	-	-	-	-	-
Phantom	10.24	-	10.24	-	-	-
Knight N.	2	-	2	-	-	-
Knight	1.5	-	1.5	-	-	-
Pizza	3.9	20	4.9	19	1.044	18.2
So. Main	1.18	-	1.18	-	-	-
Esso	9.33	20	14.42	14.91	1.141	13.07
Crtn. N	4.7	-	4.7	-	-	-
Super-K	0.3	-	0.3	-	-	-
Triple 7	5.8	-	5.8	-	-	-
Market	-	-	-	-	-	-
Resr. Hill	4.02	-	4.02	-	-	-
Lancaster	4.27	-	4.27	-	-	-
Railroad	-	-	-	-	-	-
Phant. N	5.09	-	5.09	-	-	-
Hap.Nor.	1.71	-	1.71	-	-	-
Louis	3.3	35	11.28	27.02	0.995	27.16
Crtn.E	10.52	-	10.52	-	-	-
So. Hudson	3.69	-	3.69	-	-	-
Roche	2.38	-	2.38	-	-	-
Phant. NW	2.2	20	2.2	20	0.949	21.07
Red Mtn.	7.06	-	7.06	-	-	-
Hilary	4.46	-	4.46	-	-	-
Golf	2.42	-	2.42	-	-	-
Sand Bar	2.7	-	2.7	-	-	-

Driv. Rge.	3.82	-	3.82	-	-	-
Total	107.92	95	120.59	82.33	4.281	19.23

The total area covered to date (2000 - 2010) is 46.80 hectares. The total limestone used during the period has been 1,011.41 yards. The overall rate of limestone application to date has therefore been 21.61 yards per hectare.

APPENDIX 4: Personnel Distribution for 2010

Date	Area	Square* ¹	Group	Number* ²
April 15pm	Esso	254,241	UCN* ³	11
May 10pm	SecValley	234,260	McIG1	21
May 12pm	SecValley	7,234	RBG1	26
May 18pm	Pizza	271	CrtnG7	34
May 19pm	PhantomNW	174,175,264,265, 266	McIG7	21
May 19pm	PhantomNW	174,175,264,265, 266	McIG7	20
May 21am	PhantomNW	265,266,267,268	RBGK	17
May 21pm	PhantomNW	265,266,267,268	RBGK/7	29
May 28am	PhantomNW	262,263,264	McIGK	18
May 28pm	PhantomNW	262,263,264	McIGK	21
June 1am	Esso	276,277	McIG2	23
June 2pm	PhantomNW	264,265	McIG3	28
June 3am	PhantomNW	262,263	McIGK	16
June 7pm	Esso	276,277,278	RBG4	20
June 8pm	Pizza	273,274	CrtnG5	29
June 9pm	Esso	277,279	RBG5	22
June 10am	Pizza	270,271,274	CrtnG3	38
June 11am	Pizza	271,272	CrtnG4,5	54
June 11pm	Esso	278,279	RBG1,2	40
June 14am	Esso	278,279,280	McIG5	20
June 14pm	Louis	179,286	McIG1	21
June 15pm	Pizza	271,272,274	CrtnG2	34
June 16pm	PhantomNW	268	RBG7	13
June 18am	Louis	149,150	HapG9	13
June 22pm	Louis	149,150,197,286	McIG1,3	39

July 12am	Esso	280,281	SERVE* ⁴	22
July 12am	Esso	280,281	SERVE	13
July 13am	Louis	148,149,150	SERVE	22
July 16am	Pizza	272,274,275	SERVE	18
July 16am	Pizza	272,274,275	SERVE	8
July 16pm	Louis	150,285,286,287	SERVE	13
July 21evg	PhantomNW	262,263,264,267	Comm. Vol.	10
July 28evg	Pizza	273,274	Comm. Vol.	8
Aug. 4evg	Esso	58,163,283	Comm. Vol.	3
Aug. 10pm	Esso	280,281,282,283	NRYP* ⁵	19
Aug. 11evg	Pizza	269,274,275	Comm. Vol.	6
Aug. 16pm	Louis	285,287	Summ.Pks* ⁶	35
Aug. 18evg	Louis	285,286,287	Comm. Vol.	4
Sep. 8evg	Louis	284,285	Comm. Vol.	5

*¹ Each area is divided into 50x50metre numbered squares.

*² Note that 'Number' includes supervisors, Enviro-Mentors, and teachers.

*³ University College of the North - Electrical students

*⁴ Canadian Baptists of Western Canada youth volunteers

*⁵ Natural Resources Youth Training Program

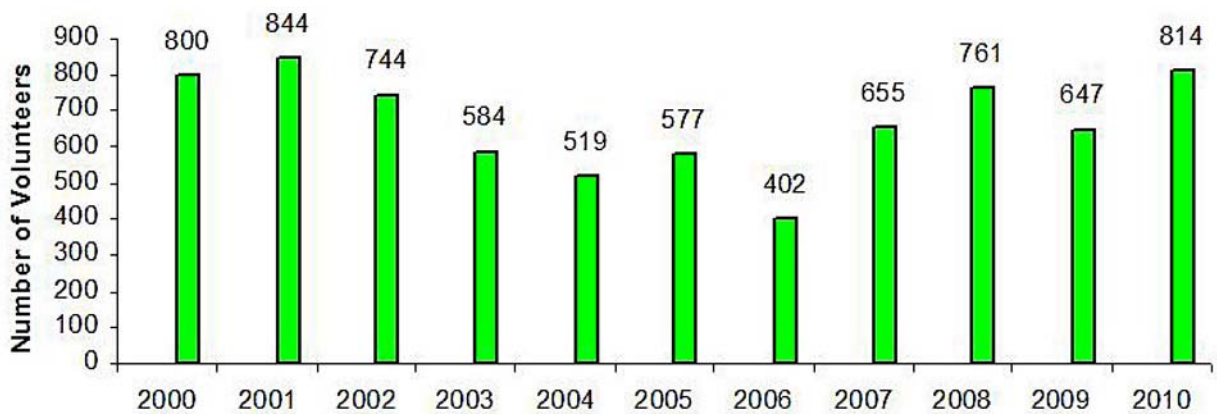
*⁶ Flin Flon Recreation Department - Summer-in-the-Parks and Base Camp groups

Personnel Distribution ~ Summary Tabulation

Group	Sessions	Number* ⁷
McIsaac School	11	248
Ruth Betts School	7	167
Creighton School	5	189
Hapnot Collegiate	1	13
Many Faces E.C.	-	-
Community Volunteers	6	36
Other Groups	9	161
Total	39	814

*⁷ Because some individuals worked in more than one session, the actual number of participants in the Green Project is less than this.

Personnel Distribution ~ 2000-2010



APPENDIX 5: Area Vegetation-Cover Scores at Fall, 2010

Area (& Distance)*	Years Treated	A	B	C	D	Total Score
1 - Balsam (1.9km)	'01	2	3	2	2	9
2 - RkCut (1.1km)	'01	1	1	2	0	4
3 - SecV-N (1.1km)	'00-'02,'08,'09,'10	2	3	2	0	7
4 - SecV-W (0.9km)	'00,'01	0	0	0	0	0
5 - FirstA (1.0km)	'00	1	3*	0	0	4*
6 - Hiawa (1.1km)	'02,'04	3	3	2	0	8
7 - Grandv (1.3km)	'01,'05-'07	2	3	2	0	7
8 - Hapnot (1.6km)	'00-'02	3	3	2	2	10
9 - Phant (2.5km)	'01-'03,'07,'08,'09	3	3	2	2	10
10 - KtNor (1.7km)	'01	3	3	2	2	10
11 - Knight (1.8km)	'00	3	3	2	2	10
12 - Pizza (2.0km)	'01,'03,'04,'10	3	3	2	2	10
13 - SoMain (1.6km)	'02,'03,'04	3	3	2	2	10
15 - Esso (2.2km)	'02,'03,'04,'08,'09,'10	2	3	2	2	9
16 - CrtNor (1.6km)	'02,'03,'04	3	3	0	2	8
17 - Sup-K (1.2km)	'02	3	3	0	2	8
18 - TripSevn (0.6km)	'02	1	2	0	0	3
19 - Markt (1.4km)	'02	2*	3	0	0	5*
20 - ResHill (0.7km)	'02,'03,'05,'08	2*	3*	0	0	5*

21 - Lanc (2.3km)	'03,'06	2	3*	0	2	7*
22 - RailRd (1.7km)	'03	2	3*	0	2	7*
23 - PhantN (1.9km)	'03,'05,'06,'09	3	3	2	2	10
24 - HapNor (1.5km)	'06,'07,'08,'09	2	3*	2	2	9*
25 - Louis (2.3km)	'04,'09,'10	3	3	2	2	10
26 - CrtEast (1.4km)	'04-'08	3	3	2	2	10
27 - SoHudson (1.5km)	'05	3	3	2	2*	10*
28 - Roche (1.9km)	'05,'06	2	3*	2	2*	9*
29 - PhantNW (2.1km)	'05,'10	2	3*	2	2	9*
30 - RedMtn (2.1km)	'06	2	3*	2	0	7*
31 - Hilary (2.4km)	'06	2	3*	2	2	9*
32 - Golf (2.7km)	'07,'08,'09	2*	3*	2	0	7*
33 - Sand Bar (2.5km)	'07,'08,'09	2*	2*	0	2	6*
34 - DrivgRge (2.8km)	'08,'09	2	2*	2	2	8*

A: Vegetation density - low/medium/high, score 1/2/3.

B: Maximum bushy seedling height - <0.5m/0.5-1.5m/>1.5m, score 1/2/3.

C: Two or more understory varieties present - score 2.

D: Self-seeded spruce/pine seedlings present - score 2.

* Approximate distance of area from HBMS Co. stack.

* Score improved since 2009.

